Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

31. (268, 601, 602.) MELICA SPECTABILE Scribn. Proc. Acad. Nat. Sci. Phila. 1885, p. 45, plate I. f. 11, 12, 13.—Common in rich meadows and on slopes near the upper limits of the bunch grass areas especially at elevations of from 7000–8000 ft.

The difference in habit of growth between *Melica bulbosa* Geyer, and *M. spectabile* Scribner are thus stated by Mr. Cusick: "M. bulbosa grows in small tufts while M. spectabile is stoloniferous, the underground runners terminated by a small bulb which produces the culm. The runner, I think, soon dies and so the stems become independent, and are never cespitose in the least."

Outline for study of Chemical Botany.

LILLIE J. MARTIN.

Botanical text-books do not furnish sufficient aid to those desiring to learn to make investigations in vegetable physiology. Students with but a general knowledge of chemistry do not understand the bearing of the microchemical tests given. The result is, that most of the work is mechanical. In fact, any really satisfactory course in chemical botany must be introduced by a short course in organic chemistry. The student who has found out the nature and quantity of the more important constituents of a plant is prepared to trace these substances in its various tissues and even to observe the chemical changes that take place in the process of growth. The outline below, mainly drawn from that proposed by Dragendorff, is an attempt to put this idea into form for class work. No particular plant is suggested, because no one greatly superior to all others yet suggests itself. Corn smut is so rich in products and so easily prepared that at first thought it seemed particularly adapted to such work, but a superficial examination showed that it required too high a power of the microscope to be of value for the microscopical work. Possibly the histological work previously done upon the asparagus and pumpkin vine might make it desirable to use one of these plants.

I. Weigh out five grams of the pulverized plant, burn off organic matter and determine per cent. ash. Make a qualitative examination of half the ash by the method of inorganic chemistry. In the other half determine the amount of some one of the constituents found. Examine ash with microscope to learn if there is anything of a structural nature about it.

II. Weigh out five grams more. Dry at 100° C. until it ceases to lose weight. Calculate per cent. moisture. Put in a glass-stoppered bottle, add 10^{cc} petroleum spirit for every gram substance left. Macerate for a week or so, shaking several times each day. Filter.

<table>
<tr><td rowspan="6">A Filtrate :—
<i>a</i>. Evaporate an aliquot part to dryness and compute total solid.
<i>b</i>. Make a superficial examination of fixed oil and determine amount.
<i>c</i>. Ethereal oil should be looked for.
<i>d</i>. Use solutions of different strengths and by means of the spectroscope identify the chlorophyll by its spectrum.</td><td colspan="6">B. Residue :—Dry at ordinary temperature and treat with ether as with petroleum spirit.</td></tr>
<tr><td rowspan="5">C. Filtrate
<i>a</i>. Determine total solid.
<i>b</i>. Make a superficial examination of the resins.</td><td colspan="5">D. Residue :—Dry at ordinary temperature and treat with absolute alcohol as with petroleum spirit.</td></tr>
<tr><td rowspan="4">E. Filtrate
<i>a</i>. Determine total solid.
<i>b</i>. Make tests for
1. Tannins
2. Alkaloids
3. Glucoses</td><td colspan="4">F. Residue :—Treat with water.</td></tr>
<tr><td rowspan="3">G. Filtrate:—
<i>a</i>. Examine
1. Mucilage
2. Inulin
<i>b</i>. Test for
1. Malic
2. Tartaric
3. Oxalic and other acids.
<i>c</i>. Make distinguishing tests for saccharose and glucose and estimate glucose volumetrically by Fehling's solution.</td><td colspan="3">H. Residue:—Treat with dilute soda.</td></tr>
<tr><td rowspan="2">I. Filtrate:
<i>a</i>. Examine albuminoids with care.</td><td colspan="2">J. Residue :—Treat with hydrochloric acid</td></tr>
<tr><td>K. Filtrate
<i>a</i>. Qualitative and quantitative examination of starch.</td><td>L. Residue
<i>a</i>. Look for lignin and its allies.
<i>b</i>. For cellulose.</td></tr>
<tr><td>A′ Compare sections of the plant before and after treatment with petroleum. Note of the substances named above and observe change in the plant by use of the solvent.
Record the observations by drawings.</td><td>C′. Examine as in A′.</td><td>E′. Examine under microscope as in A′.</td><td>G′. As in A′.</td><td>I′. Under microsc'pe as in A′.</td><td>K′. Under microsc'pe as in A′.</td><td>L′ As in A′.</td></tr>
</table>

Professor Goodale classifies organic substances as follows:

A. Products free from nitrogen :—

- I. Carbohydrates
  - 1. The cellulose group......................
    - (1) Cellulose
    - (2) Starch
    - (3) Inulin
    - (4) Dextrin
    - (5) Lichenin
    - (6) Gums
    - (7) Dextrin
    - (8) Pectin bodies
  - 2. The sugar group..
    - 1. Grape sugar.
    - 2. Fruit "
    - 3. Cane "
- II. Vegetable acids
  - (1) Oxalic
  - (2) Tartaric
  - (3) Citric
  - (4) Malic.

III. Fats or Glycerides. IV. Certain astringents. Tannins. V. Glucosides. VI. Resins. VII. Ethereal oils.

B. Products containing nitrogen :—

I. Albumin-like matter. II. Asparagin. III. Alkaloids. IV. Unorganized ferments.

Inorganic substances are there classified in "How Plants Grow":

Bases.	Acids.
Potash.	Chlorine.
Soda.	Sulphuric.
Lime.	Phosphoric.
Magnesia.	Silicic.
Oxide of Iron.	Carbonic.

Most of the substances named above are found in the analytical scheme proposed and by going through the work the student really becomes acquainted with them. If a typical plant is selected he may even learn the quantity in which some of the more important constituents occur. Something in the way of comparison is even possible. Different members of the class may take different parts of the plant at the same age or the same part at different ages and compare them as to amount of ash, water or some other constituent. Sach's discovery that "squash seeds, which, when ripe, contain no starch, sugar or dextrine, but are very rich in oil (50%), and albuminoids (40%), suffer by germination such chemical change that the oil rapidly diminishes in quantity, while at the same time starch, and in some cases sugar, is formed," suggests a great variety of more elaborate and by no means impracticable lines of comparative study on the part of botanical students. So much for micro-chemical comparisons. Micro-chemical comparisons as to the physical condition and position of the various substances in the specimens upon which the students are working will of course be made.

Even if desirable in itself two objections will be made to the course proposed—time required for the work outlined and its expense. It is thought that the large number of solvents used and the fact that they can be employed cold and that the drying and evaporating can be done at ordinary temperature will greatly facilitate matters. Of course some pieces of apparatus must be purchased, such as a good balance, polariscope and spectroscope that can be attached to the microscope, platinum dish, Liebig's condenser for getting distilled water, chemical thermometer, burrette, porcelain evaporating dish and glass stoppered bottle for each student, and test tubes, but tripods, forceps, alcohol lamps, desiccater, drying oven, etc., can be made by the students. The main reagents will be needed in some quantity, but one set of reagent bottles will hold the other substances needed.

BRIEFER ARTICLES.

Calochortus Obispoensis, n. sp.—Corm fibrous-coated, deep seated, one-half to one inch thick: stem simple or branched, one to two feet high, flexuous, leafy, often bulbiferous below: upper leaves reduced to subulate bracts, all convolute and long attenuate: flowers solitary or numerous; peduncles one to two inches long: sepals about an inch long, rotate-spreading, lanceolate, acuminate, soon convolute, veined within with brown: petals one-half to two thirds as long, rotate or recurved in anthesis, oblong, truncate, often bifid and the lobes con-